

Instructions for Use

TZB28-B450-HP-24V

**Telecentric Lights,
Luminous colour: Blue - 450 nm**

Impress

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Validity

These instructions for use are valid for the following device:

Device	Order no.
TZB28-B450-HP-24V	1-33-284

Product Identification

Designation	Description
TZB	Telecentric Lights
28	Luminous field diameter in mm
B450	Luminous colour: Blue - 450 nm
HP	High power LED
24V	24 V DC operating voltage, with integrated lighting controller

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1 INFORMATION ABOUT THE INSTRUCTIONS OF USE

This document contains technical information, important instructions for correct installation, commissioning and use, as well as product information which were up-to-date at the time of going to press.

Using this document makes it easier for you to familiarise yourself with the device and avoid malfunctions caused by improper operation.

The instructions of use and the local regulations and rules must be followed.

To ensure a safe and proper application, please read the instructions of use carefully and keep them for future reference.

1.1 Intended Use

The device is intended exclusively for use as a lighting element for industrial image processing in automation technology.

The device is not suitable for use in potentially explosive areas.

The device is intended for use in closed rooms.

The device may only be used if it is in technically faultless condition and only for its intended purpose, and only in accordance with the specifications in this instructions of use by authorised operative personnel, who are aware of the safety rules and hazards.

If the device is planned to be used for any other purpose or in a different environment, the express authorisation of the manufacturer must be obtained in advance. Any modifications or adaptations required may only be made by the manufacturer.

1.2 Improper Use

All unintended use and all device-related activities not described in these instructions of use is to be deemed as unauthorised misuse outside the legal limits of indemnity of the manufacturer.

Reasonably foreseeable misuse is:

- Non-compliance with the instructions for use,
- Faulty operation,
- Operating by personnel not qualified or instructed,
- Operating the device if it is not in a proper technical condition,
- Operating the device in ambient conditions differing from the corresponding specifications in the instructions of use
- Operating the device with voltages differing from the corresponding specifications in the instructions of use,
- Using spare parts which are not original parts from the manufacturer,
- Using incompatible accessory components,
- Improper maintenance and repair works,
- Unauthorised modifications to the device.

1.3 Qualified Personnel

The device may only be assembled, commissioned, operated, maintained, installed, set up, cleaned, repaired and transported by qualified skilled personnel.

A qualified person is deemed to be someone who has been trained and instructed for his/her activities with the device, and who has proven his/her capability to the purchaser. The operating personnel must be authorised by the purchaser for those activities at the device.

For the installation and operation of the device, the skilled personnel must know and comply with the applicable guidelines and standards for handling control equipment, electrical installations and working materials.

1.4 Warranty and Liability

The contents of this document have been checked carefully and correspond to current legislation and best practise at the time of going to press.

However, the manufacturer shall not be liable for any damage arising from the use of this edition of the manual, and rejects any warranty derived therefrom.

Within the bounds of the legal requirements, the manufacturer shall only be responsible for the technical safety characteristics of the device if the maintenance, repairs and modifications to the device are performed by himself or by authorised skilled personnel in accordance with his instructions.

Loss of warranty

The manufacturer shall accept no liability or warranty in the event of improper use, opening of the device or incorrect maintenance.

2 SAFETY

2.1 Presentation of Safety Instructions

Each safety instruction is introduced by a key word and colour highlighted.

The key word indicates the degree of danger. The danger and its cause are described, and then the measures to prevent conceivable consequences of the danger. These measures must be taken.

DANGER

Indicates an imminent danger with high risk, resulting in severe injuries or death if not avoided.

WARNING

Indicates a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.

CAUTION

Indicates a hazardous situation with low risk, resulting in minor or medium injuries if not avoided.

NOTICE

Indicates a situation that may result in property damage.

2.2 Safe Handling of the Device

Read the following applicable safety instructions carefully and completely. Follow the instructions for your own safety, the safety of other people, and to avoid damage to the device and the connected technical equipment. Hazards going beyond the general safety instructions are referred to separately at the relevant points in this manual.

 **DANGER**



Possibly hazardous optical radiation emitted from this product

- Do not look into the lighting when operating.
- Eye injury may result.

 **CAUTION**



Risk of injury due to electric shock.

- Before starting work on the device, disconnect it from the operating voltage supply.
 - Follow all applicable safety regulations for the preparation and operation of electrical devices.
-

3 SCOPE OF DELIVERY AND ACCESSORIES

Power supply and communication cables are required to operate the device. Because of the many possible configurations, the cables are listed in the accessories rather than included in the scope of delivery.

3.1 Scope of Delivery

Designation	Quantity
Device TZB28-B450-HP-24V	1 x
Covering cap	1 x
Instructions for Use TZB28-B450-HP-24V	1 x
Safety label "optical radiation"	1 x

3.2 Accessories

Lens holder

Designation	Description	Order no.
Lens Holder d35.5	Holder for telecentric lenses and lightings with 35.5 mm clamping diameter, for vibration-free attachment	2-90-124

Polarizing filter / Filter adapter

Designation	Description	Order no.
Pole filter M30.5x0.5	Linear polarizing filter in the range of 420 nm to 780 nm	2-91-227
Filter adapter d35.5 - M30.5	Slip-on adapter for use of a M30.5x0.5 filter on lenses with 35.5 mm clamping diameter	2-91-188

Deflection mirror

Designation	Description	Order no.
Deflection mirror 90-35.5	90° deflection, attachment for telecentric lenses and lightings with 35,5 mm front diameter	2-25-116

DIN rail power supplies

Designation	Description	Order no.
Power supply 24V/120W/5A	for DIN rail mounting, without connection cable, type: SDR-120-24	4-40-218

Connection cable M8-4-pin, straight plug, 4A, 60V

Designation	Description	Order no.
Cable-M8-4p-4A- straight-10m	Connection cable with 4-pin M8 socket and open cable end with wire-end ferrules, 4 x 0.25 mm ² , 4A, 60V, PUR, IP67, straight plug	1-11-607

Connection cable M8-4-pin, angled plug, 4A, 60V

Designation	Description	Order no.
Cable-M8-4p-4A- angled-2m	Connection cable with 4-pin M8 socket and open cable end with wire-end ferrules, 4 x 0.25 mm ² , 4A, 60V, PUR, IP67, angled plug	1-11-605
Cable-M8-4p-4A- angled-5m		1-11-604
Cable-M8-4p-4A- angled-10m		1-11-606

Connection cable M8-4-pin, straight plug, 5A, 30V

Designation	Description	Order no.
Cable-M8-4p-5A- straight-1m	Connection cable with 4-pin M8 socket and open cable end with wire-end ferrules, 4 x 0.5 mm ² , 5A, 30V, PUR, IP67, straight plug	1-11-611
Cable-M8-4p-5A- straight-2m		1-11-612
Cable-M8-4p-5A- straight-3m		1-11-613
Cable-M8-4p-5A- straight-4m		1-11-614

Extension cable M8, 4-pin, 5A, 30V

Designation	Description	Order no.
Extension-cable-M8-4p-5A-0.6m	Extension cable with 4-pin M8 socket and 4-pin M8 plug, 4 x 0.5 mm ² , 5A, 30V, PUR, IP67, socket and plug straight	1-11-093
Extension-cable-M8-4p-5A-1.5m		1-11-094
Extension-cable-M8-4p-5A-3.0m		1-11-095

4 DEVICE DESCRIPTION

4.1 Device Views

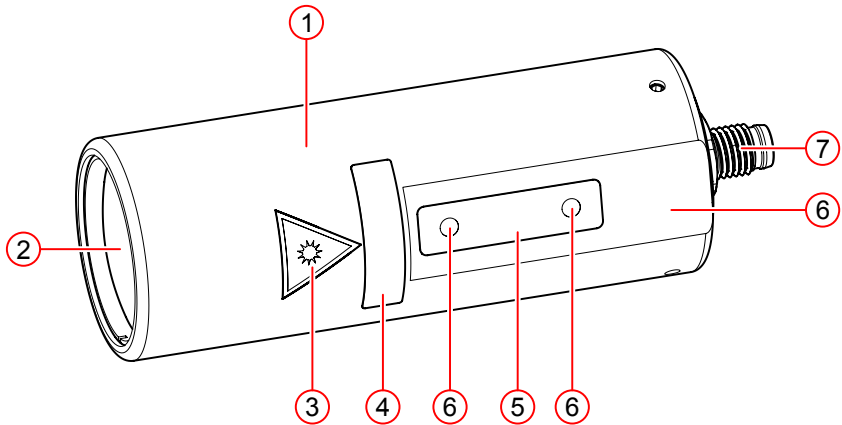


Image 1: Device view

- 1 Casing
- 2 Light-emitting surface
- 3 Warning notice
- 4 Identification plate
- 5 Note screw-in depth
- 6 Mounting surface with mounting holes
- 7 Connector M8-4pin

4.2 Notices on the device

Following instructions are provided on the device:

Warning notice



Image 2: Notice: optische Strahlung

Type plate

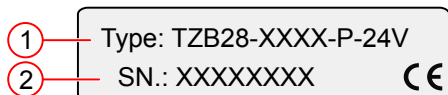


Image 3: Type plate

- 1 Device designation
- 2 Serial number

Notice Screw-in depth

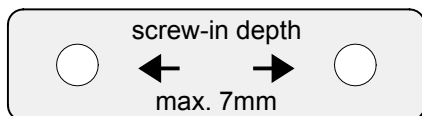


Image 4: Notice Screw-in depth

5 TECHNICAL DATA

5.1 General Parameters

Parameter	Characteristic
Housing material	Aluminium, black anodised
Optical material	Glass
Housing dimensions	Length: 94.5 mm without connector Diameter max.: 35.5 mm
Dimensions light-emitting surface	Diameter: 29 mm
Connector	Male connector, M8, 4-pin
Weight	170 g
Degree of protection	IP 50
Safety class	Class III, safety extra low voltage (SELV)
Risk group (DIN EN 62471)	Risk group 3

Connector

Parameter	Characteristic
Connector	4-pin M8 connector
Mechanical operation	> 100 mating cycles
Degree of protection (IP)	IP 67 (if connected)
Rated current	3 A
Rated voltage	50 V

5.2 Electrical Parameters

Parameter		Min	Nom	Max
Operating voltage U_o		19 V	24 V	29 V
Power consumption at $U_o = 24$ V DC		2.5 W	3.0 W	3.5 W
Switch input ON/OFF	Input voltage OFF	0 V		2.0 V
	Input current OFF	0 mA		0.2 mA
	Input voltage ON	4 V		29 V
	Input current ON		1.0 mA	2.0 mA
	Input delay t_D	50 μ s	100 μ s	150 μ s

5.3 Photometric Parameters

Parameter	Min	Nom	Max
Peak wavelength λ_{peak}		451 nm	
Dominant Wavelength λ_{dom}	439 nm	455 nm	457 nm
Spectral bandwidth $\Delta\lambda$		18 nm	
Full divergence angle 2α		1°	
Luminous field diameter ⁽¹⁾		29 mm	
Luminous efficacy of radiation		78.5 lm/W	
Continuous operation / Switching operation			
Irradiance ⁽¹⁾			43 W/m ²
Illuminance ⁽¹⁾			3.4 klx
Radiance ⁽²⁾			78.5 kW/m ² sr
Luminance ⁽²⁾			6.2 Mcd/m ²

⁽¹⁾ at 200 mm working distance

⁽²⁾ at 11 mrad

Spectral Emission

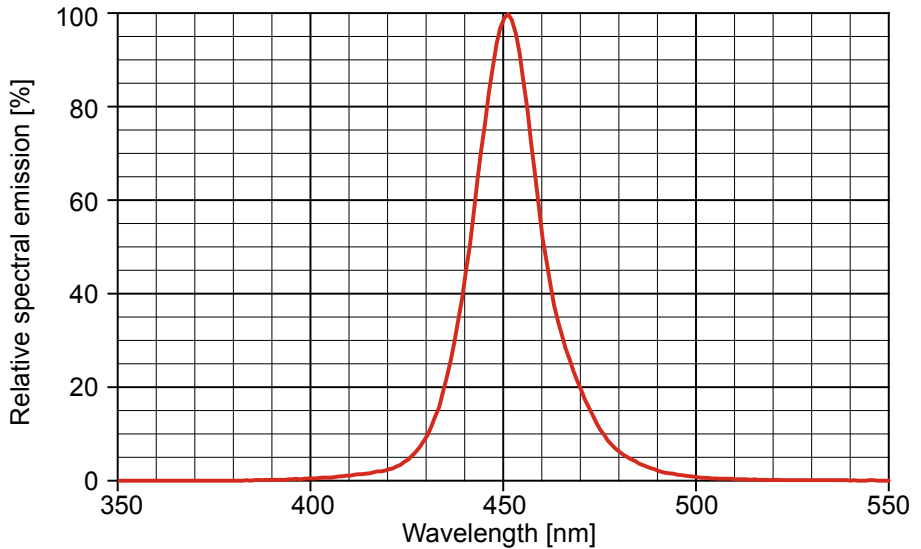


Image 5: Spectral emission

5.4 Conditions for Operation, Storage and Transport

Observe the specified ambient conditions when transporting and storing the device.

For accessories, connected devices and components observe the specific information in the associated instructions for use.

Ambient Conditions

	Operation	Storage /Transport
Temperature	0 °C to 45 °C	- 20 °C to 60 °C
Air humidity	20 % to 80 %	20 % to 95 %
Condensation water	not permissible	not permissible

5.5 Technical Drawings

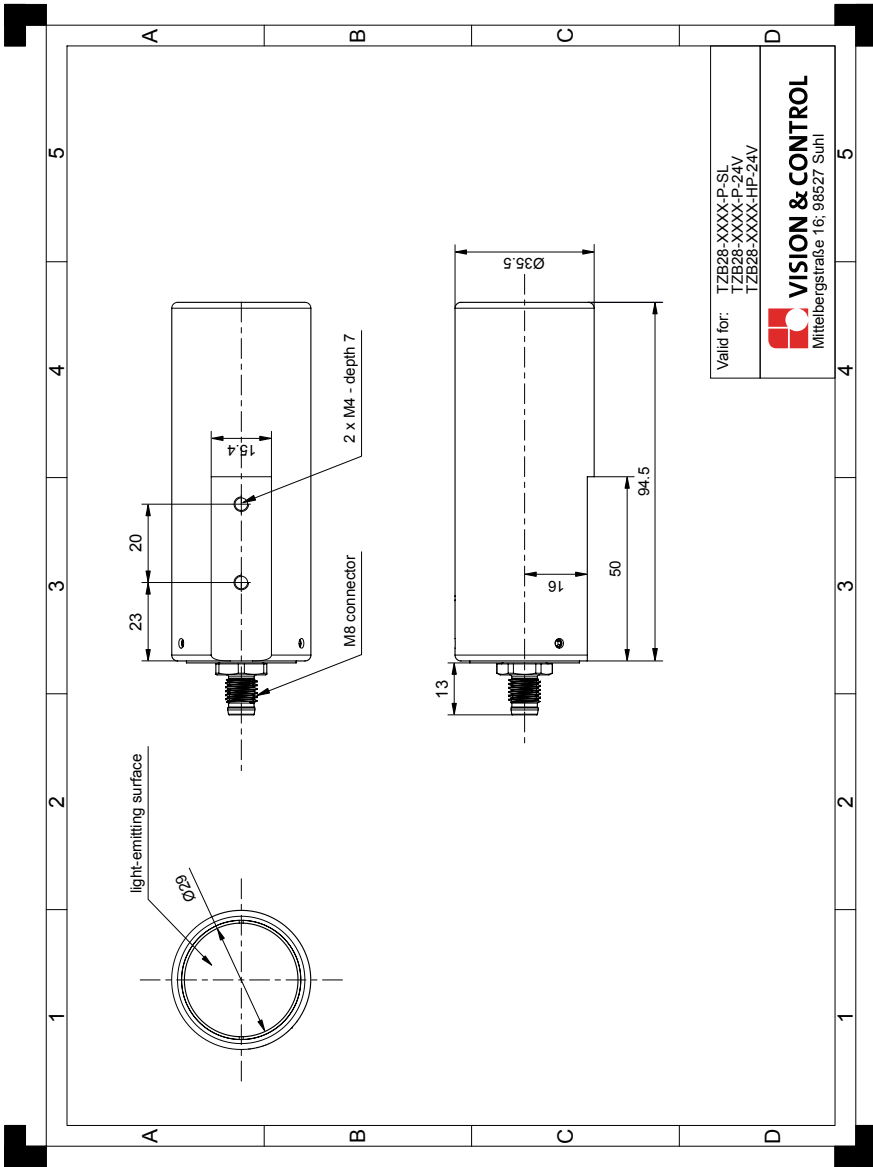


Image 6: Technical Drawings (dimensions in mm)

6 COMMISSIONING

NOTICE

Installation and connection operations may only be performed in the off and de-energised state.

6.1 Unpacking

1. Lift the cardboard, together with the device, out of the carton.
2. Fold out the tucked in sides on the bottom of the cardboard. The film loosens and forms an insertion pocket.
3. Remove the device out of the insertion pocket.
4. Dispose the packing material.

6.2 Mounting the Device

For mounting the device there is a mounting surface with tapped holes on the bottom.

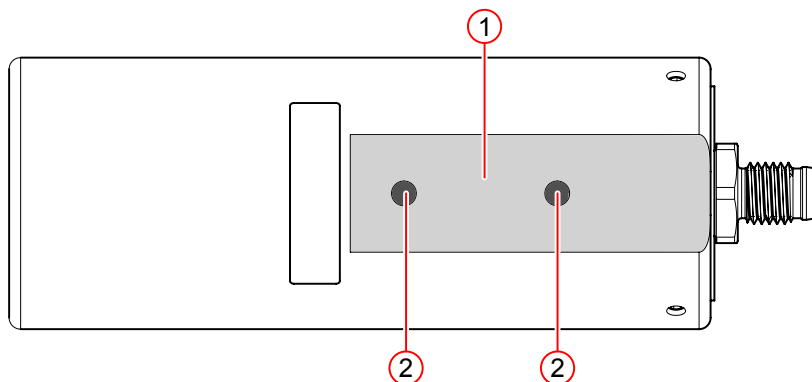
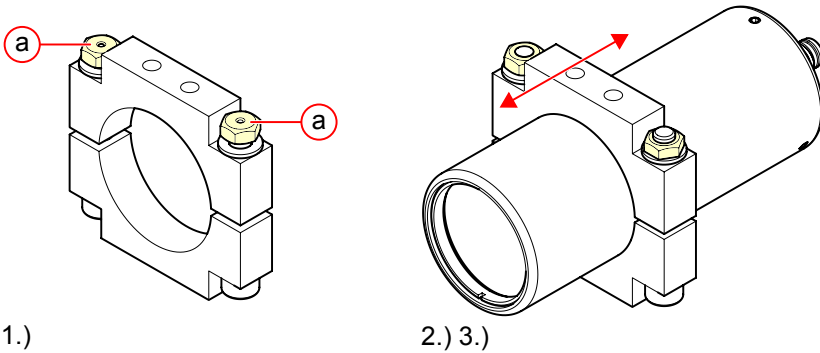


Image 7: Mounting holes

- 1 Mounting surface
- 2 2 x M4x0.5 tapped hole
maximum screwed-in depth: 7 mm

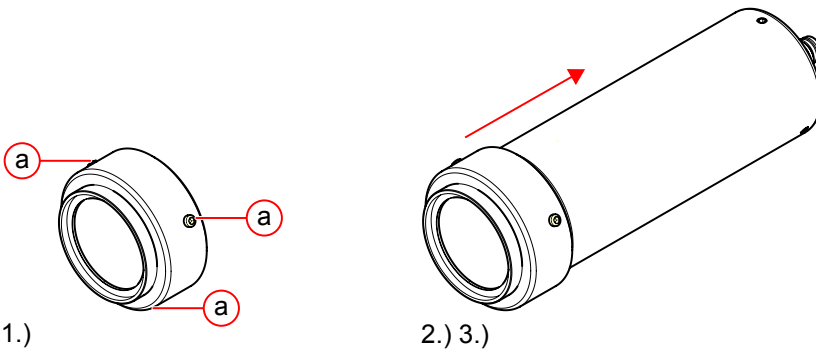
6.3 Mounting the accessories

Mount the Lens Holder



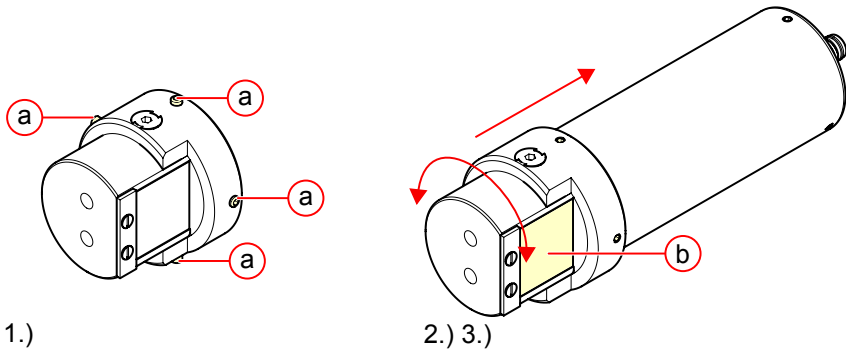
1. Loosen the M5 hexagon nuts (a) on the lens holder.
2. Slide the lens holder to the desired location on the lighting.
3. Tighten the M5 hexagon nuts alternately hand-tight in small steps.

Mount the Filter adapter (slip-on adapter)



1. Loosen the M3 threaded pins (a) of the slip-on adapter.
 2. Attach the slip-on adapter on the lighting.
 3. Tighten the M3 thread pins alternately hand-tight in small steps.
- Then screw the filter into the internal thread of the slip-on adapter.

Mount the Deflection Mirror



1. Loosen the M3 threaded pins (a) of the deflection mirror.
2. Attach the deflection mirror on the lighting. Rotate the mirror (b) to the desired position.
3. Tighten the M3 thread pins alternately hand-tight in small steps.

6.4 Attach the Security Label

Due to the individual assembly and installation options, the device is supplied with the safety label "optical radiation".

After completing all assembly work, attach the safety label to the device so that it is clearly visible.

Attach the safety label so that it is legible without exposing yourself to the optical radiation of the device.

If a sufficiently large and clearly visible area is not available on the device, attach the safety label close to the product.

6.5 Connecting

NOTICE

Cable damage

- Comply with the specified minimum bending radius.
- Cables must generally be mounted with a strain relief clamp.
- Use cables corresponding to the specification (see data sheet).

6.5.1 Pin assignment

Use the M8 connector to connect the device according to the pin assignment.

Pin assignment

Connection diagram

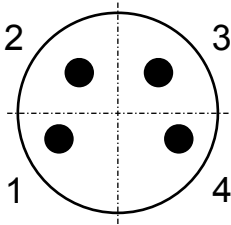
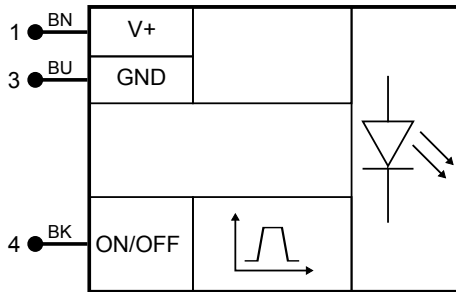


Image 8: M8 connector, 4-pin



Pin	Core colour	Signal	Description
1	BN (brown)	V+	Operating voltage
2	WH (white)	NC	Do not use
3	BU (blue)	GND	Ground
4	BK (black)	ON/OFF	Switch input

7 OPERATION

DANGER



Possibly hazardous optical radiation emitted from this product

- Do not look into the lighting when operating.
- Eye injury may result.

CAUTION



Physiological effects by flashing lights

- Working under flashing lights can cause effects such as headache, nausea, or epileptic seizures.
- Avoid exposure to certain kinds of flashing lights or stroboscopes.
- Wear protective goggles.
- If you have a known history of epilepsy, do not work or stay in areas where there are flashing lights or stroboscopes.

CAUTION



Impairment of eye-sight due to dazzling.

- Do not look during operation directly in LED lighting or whose rays.
- Wear protective goggles.
- In the event of dazzling, allow sufficient time for the eyesight to adapt to the ambient illumination before commencing other activities.

7.1 Making Operational Readiness

The device is switched on by applying the operating voltage.

The device is switched off by disconnecting it from the operating voltage supply.

7.2 Operating Modes

The integrated controller supports the following operating modes:

Continuous operation

The lighting is switched on by setting the ON/OFF signal after the delay time t_d . Resetting the ON/OFF signal turns off the lighting.

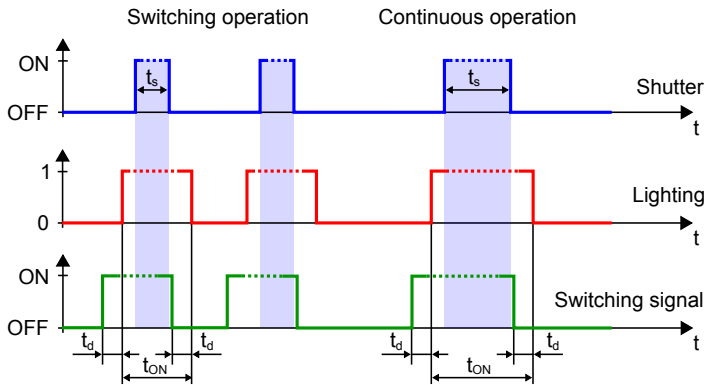
Switching operation

The switching operation is carried out by continuously setting and resetting the switching signal ON/OFF.

Consider the switching delay time t_d of the lighting. Set the exposure time of the camera to be within the t_{ON} range.

The length of the Power-on time t_{ON} corresponds to the length of the switching signal.

Switching behaviour



t_s Exposure time of the camera

t_d Delay time

t_{ON} Power-on time

		Min	Nom	Max
Delay time	t_d	50 μ s	100 μ s	150 μ s
Power-on time	t_{ON}	100 μ s		∞

8 MAINTENANCE AND SERVICE

8.1 Maintenance

The device is maintenance-free. Depending on the operating environment, it may have to be cleaned.

The housing can be cleaned according to the conditions applicable to the given protection class.

Cleansers must not be applied directly to the housing, and the housing must not be bathed.

Cleaning the outside

- Clean the outside with a damp cloth.
- Remove excessive dirt with an approved anodised aluminium cleaner. Refer to the instructions of the cleaner.
- The connectors must be clean and dry before the device is connected and put into operation.

Cleaning the optical surfaces

NOTICE

Follow the specified cleaning sequence. Never use dry cloths for cleaning. This allows dust and other contaminants to be rubbed into the lens surface, thereby damaging it.

1. Remove non-adherent dusts with a blower brush or cleaned compressed air.
2. Remove larger non-adherent contaminants such as chips or granules by dabbing with a cloth. Never rub under any circumstances.
3. When all non-adherent particles have been removed, use an untreated lens cleaning paper for lenses or an optical cleaning cloth that was soaked in an especially for optics suitable detergent. Observe the instructions of the manufacturer.

Cleaning by the manufacturer

The device can be sent to the manufacturer for cleaning (for a fee). Please contact our technical support.

8.2 Service

Technical Support

Please contact our technical support if you have any technical questions concerning our products.

We will be glad to be of service:

Monday to Thursday 8:00 to 17:00, and Friday 8:00 to 15:00.

Vision & Control GmbH

Mittelbergstraße 16

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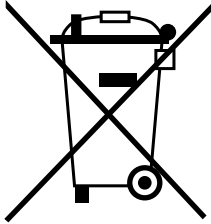
Defective device

If the device has a defect, the manufacturer can repair or exchange it. Please contact your local sales partner or technical support.

9 DISPOSAL

The device and its accessories and packaging must be sent to environmentally compatible recycling.

Do not throw electrical devices or tools into the household waste!



According to European Directive 2012/19/EU on waste electrical and electronic equipment and its implementation in national law, unusable electric tools must be collected separately, and sent to environmentally compatible recycling.

Disposal, including that of individual components, must also always be in a way that does not harm the environment, which means it must be done in accordance with the currently valid legal regulations.

Please contact the manufacturer, your local specialist dealer or the relevant national authority for the proper disposal of old devices.

The electrical and electronic components must be sent to a specialist recycling company or to the manufacturer for proper disposal.

10 EU DECLARATION OF CONFORMITY



Vision & Control GmbH

Mittelbergstraße 16

D-98527 Suhl, Germany

Representative: Dr. Jürgen Geffe, Managing director

We, Vision & Control GmbH Suhl, declare that the product described below

- Designation: TZB28-B450-HP-24V
- Order no.: 1-33-284

has been manufactured in accordance with the following standards and normative documents:

- 2014/30/EU - Electromagnetic compatibility (EMC directive)
- DIN EN IEC 61000-6-2:2019-11 - Electromagnetic compatibility (EMC) - Immunity for industrial environments
- DIN EN IEC 61000-6-4:2020-09 - Electromagnetic compatibility (EMC) - Emission standard for industrial environments
- DIN EN 61000-4-2:2009-12 - Electromagnetic compatibility (EMC) - Testing and measurement techniques - Electrostatic discharge immunity test
- DIN EN 62471:2009-03 / EN 62471:2008 - Photobiological safety of lamps and lamp systems

The product complies with the requirements of Directive 2011/65/EU (RoHS 2) of June 8, 2011 along with Directive 2015/863/EU (RoHS 3) of March 31, 2015 of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Suhl, 2021-01-25

Dr. Jürgen Geffe

Managing director

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